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Previous references

Later references (Educ

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GENERAL AND REVENUE SECRETARIAT

Serial Nos 1—

Major Part B for, October, 1877

SUBJECT

Report on the Quarterly Examination of students of the School of Engineering and Natural Sciences held in August 1877.

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From The Director of Public Instruction

To
Secretary to Chief Commissioner,
General Department

Section Earth
No 11 - 1877
Serial No 1

Dated 12th September 1877
Despatched 16
Received 14
Rep 15

ENCLOSURES NO X16

General No 2253 } 1877
No

Forwards report from the Principal Civil Engineering & Natural Science on the quarterly examination of students held last month with the statement of marks and question papers

Recd 15th 6 P.M.

No 2253

Office of the Director of Public Instruction
Bangalore, 12th September 1877

From

The Director of Public Instruction

To

The Secretary to the Chief Commissioner

Sir,

I have the honour to forward in original the report from the Offg Principal of the School of Engineering and Natural Science on the quarterly examination of students held last month, together with the statement of marks obtained and copies of the question papers

2. The Upper Department is composed of 8 third year students (5 Engineering and 3 Forest), and of 4 first year students According to the numerical results of the examination they stand in the order given in the margin. Srinivasa Rao, who has always come out at the head of the school, was ill and unable to attend on one day of the examination. hence he appears at the bottom in no of marks. Of the senior stu

Third year students

	Engineering	maximum 500
1	Gorndaekari	387
1	Raghuvalu Naidu	387
3	Venkatachari	364
4	Balakrishna Tevari	359
5	Srinivasa Rao B A.	311

	Forests	maximum 4600
1	Abdul Karim	310
2	Lovery	287
3	Muttanna	285

First year students.

		maximum
1	Ranga Rao	
	[redacted]	

the answering in Chemistry was very fair; Abdul Karim, who assists in the Laboratory, obtaining full marks in that subject. The paper on Spherical Trigonometry was set by Mr Waters, Principal of the Central College, and that on Surveying and Levelling by Mr Mc Hutchin, Assistant Engineer, in the absence of Captain Bowen R E, who had undertaken it. The results in these and the remaining subjects are reported as satisfactory. Muttanna, the Coorg student, is stated to display great aptitude for the study of Spherical Trigonometry, and stood first in that subject. Among the first year students, the answering was fair in all subjects except co-ordinate geometry, but a difficult paper was set on this subject by Mr Waters, under the impression apparently that it was for the advanced students.

3 In the Lower Department are 6 first-year students who came out in the order given in the margin. Arumugam Modaliar failed in two subjects, Algebra and Trigonometry. Raghunatha Ayangar and Ananda Rao also failed in this last subject, but the latter was only one mark short of the minimum, and the former answered well in the other subjects.

	Maximum	500
1	Ramanujachari	257
2	Kadervelu Modaliar	245
3	Srinivasa Rao	195
4	Raghunatha Ayangar	187
5	Arumugum Modaliar	182
6	Ananda Rao	168

I have the honour to be,
Sir,
Your most obedient Servant,

Director of Public Instruction

No 20
Dated
Rec'd 11/9/77

3
Enclosure

From The Superintending Principal
School of Engineering and
Natural Science

To
The Secy Bd.
Boards of Public Instruction,
Mysore, and Coorg.

Sir.-

I have the honor to report as follows regarding the result of the recent quarterly Examinations.-

2nd Years Engineering Students,-
Chemistry.- In this class the Engineering and Forest Students worked together.- Abdul Kareem, a Forest student got full marks, Venkatcharrys answering was very good.- It will be seen that the Examination Paper, was of the most elementary kind,- but nevertheless, considering the very few Lectures the class has had on the subject, the answering was very fair.- The results in order of merit were-

		Maximum No of marks, 100-	
1	Abdul Kareem	100	Full marks- Forest
2	Venkatcharry	99	
3	{Linnarassa Rao. Kagonalla Naidoo}	96-	
4	Balat Krishna Thorp	94-	
5	Gowda Chetty	88-	Forest
6	Mortimer	79-	Forest
7	Lowry	75	

6

Mathematics. Spherical Trigonometry – This class was examined by Mr Watts M.A. – and he expressed himself very well satisfied with the answering Gounda Chandoo gained highest marks, 2 c 75 out of 100, which was very good answering – The lowest was Venkatchary – 49 marks Semmarasa Roa was unable to attend this through illness, His knowledge of the subject as shown in class, is however very good indeed –

Surveying and Levelling –

The answering was very good, The paper was however an easy one, Highest marks were gained by Rajavalla Naidoo, 95 out of a hundred, which was very good answering indeed –

Engineering

The answering was very fair – The highest marks 83 being obtained by Gounda Chary and the lowest 61 by Venkatachary – Mr Hallifax Assistant Engineer set this paper, in the absence of Captain Bowen Superintending Engineer, who had kindly promised to give a paper, but had to go to the Board Island –

Drawing, Ragavallo Nadar, and Venkatachary gained highest marks 66 each, Govinda Chetty the lowest, 55

On the whole Govinda Chetty and Ragavallo Nadar are equal, Venkatachary next, Bala Krishna, Ivory next, Srinivasa Rao having been unable to attend at Spherical Trigonometry was out of the competition.

First year Engineering Class.

Co-ordinate Geometry.- This class was under me personally- and was examined by Mr Wates- The highest marks were allotted to Ranga Rao 65 out of 100, and the lowest to Narayan Rao- 36 out of 100.- The answering was not very good but the paper was an exceedingly difficult one for men who had but a limited time at the subject.-

Plane Trigonometry- This class was under Mr Sorlal Royal- and was examined by me as I must as possible had an examiner, other than teacher. The answering was very good, the highest marks 83 being gained by Ranga Rao, and the lowest 56 by Narayan Rao.

Physics. Examiner, and teacher Mr Pal, Highest marks Ranga Rao 84

Lowest Narayan Rao 36

Surveying and Levelling, — Forbes, and Cummins Mr Sohrab Kyah — The answering was pretty fair except Prabudada Roy, who got only 26 marks out of 100, The highest marks were obtained by Deotaram Rao — 52.

Forest Department,

There were examined with the 3rd/4 years Engineers in Chemistry Surveying and Spherical Trigonometry, — Abdul Kareem was first in Chemistry getting full marks, 100, His answering was excellent — He assists me in the Laboratory, — Mr Covey was first in Surveying obtaining 72 marks out of 100, and Hoshmah the Coorg Student was first in Spherical Trigonometry, a study for which he has displayed great aptitude, ~~Coorg~~ He was awarded by Mr Waites, 62 marks out of a maximum of 100 The three forest students had a very even struggle for first place, — Chemistry placed Abdool Kareem at the head of the list —

The Lower Department were examined in Algebra Plane Trigonometry Surveying drawing and Euclid — Kamanchiraj is at the head of the list Anundha Rao got one hundred of the prescribed maximum in

Trigonometry.— The paper was set by Mr Kirby and was a very difficult one, considering the class it was given to. Arumugam Mordely failed altho the prescribed minimum in both Algebra and Trigonometry — Ragunatha Iyengar is below the minimum in Trigonometry but his answering in the subjects was good. Arumugam Mordecai is the only one who failed in two subjects, he however, did well at the last quarterly examinations, except in Euclid.

Among the third years Engineers Semaraasa Roa, has always stuck to first place, At the recent examination illness prevented him from attending at the Spherical Trigonometry paper. Had he been present there can be no doubt that his answering would have placed among the first in that subject if not the first. The two men were bracketted first ~~[illegible]~~ did not attain their position without steady hard work, and their total of 387 marks out of 500, were I think creditable

Copies of the examination papers and lists of marks, are sent herewith

I have the honor to remain
Sir
your most obedient servant
M Kirkwood

School of Engineering and Natural Science Bangalore

Results of the Quarterly Examination held in August 1877

Upper Department – Senior Class

3rd Year Engineers

Names	Chemistry	Surveying & Levelling: Theoretical	Surveying & Levelling: Practical / Drawing	Surveying & Levelling: Total	Engineering	Spherical Trigonometry	Grand Total	Remarks
Maximum	100	100	100 / 100	200	100	100		
Balakrishna Tevaru	94	74	60	184	74	57	359	Third
Govinda Chetty	88	86	55	141	93	75	387	First
Raghavendra Naidu	96	95	66	161	61	63	387	Equable & gallant Spherical Trigonometry
Sreenivasa Rau	96	85	60	145	70	absent	311	
2 Venkata Chetty	99	92	66	118	64	49	364	Second

Forest Class

Names	Chemistry	Surveying & Levelling: Theoretical	Surveying & Levelling: Practical / Drawing	Surveying & Levelling: Total	Botany	Spherical Trigonometry	Grand Total	Remarks
Maximum	100	100	100 / 100		100	100	400	
Abdul Kareem Sahib	100	70			89	51	310	Surveying very fair
Mr Lovery	75	72			86	54	287	
Muthannah	79	66			78	62	285	

8th Sept. 1877

W. Gleadell

School of Engineering and Natural Science Bangalore

Results of the Quarterly Examination held in August 1877

Upper Department - Junior class - 1st Year Engineers

	Names	Algebra	Plane Trigonometry	Surveying & Levelling: Theoretical	Surveying & Levelling: Drawing	Surveying & Levelling: Total	Coordinate Geometry of 2 Dim.	Total	Remarks
	Maximum	100	100	100	100	200	100	500	
3	Narayana Rao	36	56	45	52	97	36	225	Third
4	Prahladha Rao	28	60	26	46	72	56	216	Fourth
1	Runga Rao	84	83	48	53	101	65	333	First
2	Sitaram Rao	54	43	52	55	107	47	281	Second

School of Engineering & Natural Science
Bangalore 7th Sept 1877

Offg Principal

School of Engineering and Natural Science Bangalore

Results of the Quarterly Examination held in August 1877

Lower Department

	Names	Algebra	Plane Trigonometry	Surveying: Theoretical	Surveying: Drawing and Practical	Surveying: Total	Euclid	Grand Total	Remarks
	Maximum	100	100	100	100	200	100	500	
6	Anandha Rau	34	24	25	53	78	30½	167½	Good
5	Arumugam Mudely	20	24	35	78	113	25	182	Good
2	Kadiveln Mudely	38½	46	39	66	105	55½	245	Good
4	Raganadha Iyengar	35	22	38	46	84	46	187	Fourth
1	Ramanuja Charry	65	60	31	50	81	50½	256½	First
3	Srinivasa Rau	22½	34	41	37	78	60½	195	Second

Asst Engineering & Asst Surveyor

Bangalore 7th Sept 1877

Officiating Principal

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School of Engineering and Natural Science, Trugalore

QUARTERLY EXAMINATION

August 1877

CHEMISTRY

Examiner —W P LYNAM C F

1 If it be required to produce one hundred pounds weight of oxygen what weight of Potassium chlorate will be necessary by the ordinary process

2 How can Hydrogen be obtained from water —

3 If 2·3 volumes of gas be at a temperature of 0° centigrade to what temperature must they be heated in order to expand to 295 volumes

4 State Boyle's law of pressure

5 Explain what is meant by exosmose and endosmose

6 Define the term Thermal unit

7 Write the chemical symbols of Sulphuric acid Nitric acid carbonic acid —Aqua Regia —Hydrochloric acid —Potassium chlorate —Chloric acid —Ammonia and Cyanogen

8 State composition by weight of compounds mentioned in question No 7

9 Explain what is meant by the nascent state and catalysis

10 Describe the electrolytic decomposition of water

Surveying & Levelling 12

Examiner - W P Lyman C E

I Describe all the ways in which an unpractised surveyor or Leveller is liable to make wrong entries in his field book.

II The three sides of a triangle are 2132, 1644 & 1913 Links of Gunter's Chain: find the area in acres, roods & perches, either by ordinary arithmetic or by Logarithms.

III Give a description of how you would carry out a morning's Surveying work close by Bangalore with full details from the time the chain is thrown out until it is strapped up again. State the precautions against error.

IV Explain your code of signals to a man holding a flag 3212 Links distant (Gunter's Chain) and also to your leading Chainman 1050 Links distant

V Suppose you are commencing a line of survey, you check your chain by a steel chain 66 feet & take two sights on your working chain making it agree with the steel chain. After a month's work you compare the working chain with the steel chain which has not in the meantime been used, and you find it to have extended 4 inches. Immediately afterwards the steel chain is 2 inches longer than it should be. State the correction for your area as calculated from your own chain. ~~Suppose you commence~~

VI Suppose you commence levelling from the top to the bottom of an inclined plane 1 foot in 10 which is 660 feet long (horizontally) and you find that the line of Collimation is out of adjustment, and that you cannot adjust it, state the least number of sights by which you can ascertain the difference in height by levelling between the top & bottom.

VII State by sketches what is meant by "adjustment for Parallax"

VIII Describe the adjustments of the Level

IX Describe the process of taking a Theodolite Survey. Describe the process in detail of taking the Theodolite not at the head sitting up Communicating work at the first station completing work at the finishing station and going on to commencing work at the second station Switch & describe the Vernier with the upper & lower limbs to read 2.0 seconds.

X Suppose two points on the same level 6,132 links apart passing hill clear of jungle, between these points 210 feet high with gentle slopes, how would you run a line over the hill from one point to the other.

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School of Engineering and Natural Science, Bangaloce

QUARTERLY EXAMINATION

August 1887

UPPER DEPARTMENT

ENGINEERING

Examiner —W Mc HUTCHIN Esq C E

1 State the compositions of granite Sandstone Porphyry Marble and Ransome's patent stone?

2 Describe in full the ordinary process of brickmaking in the Province of Mysore?

3 Describe Hoffman's Patent brick Kiln?

4 Describe the different kinds of tiles used in roofing and give details of the cost per square in Bangalore if Mangalore tiles are used?

5 State the Chemical composition of Portland cement and of shell lime also explain why cement sets under water?

6 Explain the System of Pierres perdue, also give the composition and minimum size of the blocks used at Algiers?

7 Describe the process of Puddling for wrought Iron

8. Explain the difference in composition between Steel and Cast Iron?

9 Draw a King Post Truss for a room of 30 feet span in the clear to carry an ordinary roof of 1 course of Flat Tiles and 2 courses of Pan Tiles given dimensions of timber required with enlarged drawings of all joints also estimate the cost of the *truss timber* being 3 as per cub foot and iron 3 as a pound?

10 Describe any process you know of mixing mortar by machinery?

11 Give data for the cost of brickmaking in Bangalore?

12 Give the Tensile and Transverse Strengths of the following Cast Iron Wrought iron, Steel Teak English Oak Poon

13 Calculate the cubic contents of a straight Railway cutting 800 feet in length middle depth of 20 feet at one end and 10 feet at the other with an uniform side slope of 1 in 3 in hard gravel the breadth of cutting at bottom to be 18 feet including side drains on both sides 2½ feet wide, and 2 feet in depth

W P LYNAM C E

Officiating Principal

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School of Engineering and Natural Science, Bangalore

QUARTERLY EXAMINATION

August 1877

UPPER DEPARTMENT

SPHERICAL TRIGONOMETRY

1 Prove that any theorem will remain true when the angles are changed into the supplements of the corresponding sides and the sides into the supplements of the corresponding angles

2. The sum of the three sides of a spherical triangle is less than the circumference of a great circle and the three angles are together greater than two right angles

3 The angles at the base of an isosceles triangle are equal

Two angles of a spherical triangle are bisected by arcs of great circles terminated by the opposite sides prove that if these arcs be equal the triangle is isosceles

4. Prove $\cos a = \cos b \cos c + \sin b \sin c \cos A$ where c is $>$ than a $\frac{\pi}{2}$ quadrant
ABC is a spherical triangle each of whose sides is a quadrant P any point in the triangle prove that

$$\cos^2 AP + \cos^2 BP + \cos^2 CP = 1$$

5 Prove independently that the sines of the angles of a spherical triangle are proportional to the sines of the opposite sides
ABC is a spherical triangle and arcs AO BO CO meet the opposite sides in D E F prove that

$$\sin BD \sin CE \sin AF = \sin CD \sin AF \sin BE$$

Prove also that the sides of the triangle DEF meet those of the triangle ABC in points lying on a great circle

6 Prove that —

$$\cot a \sin b = \cot A \sin C + \cos b \cos C$$

7 Prove that —

$$\tan \frac{1}{2}(a-b) = \frac{\sin \frac{1}{2}(A-B)}{\sin \frac{1}{2}(A+B)} \tan \frac{c}{2}$$

$$\cos \tfrac{1}{2}(A+B) \cos \tfrac{1}{2} c = \cos \tfrac{1}{2}(a+b) \sin \tfrac{1}{2} C$$

8 P is a point within a spherical triangle ABC BC CA AB are quadrants
Prove that

$$\sin 2PBA = 2\frac{\cos PA \cos PC}{\sin^2 PB}$$

9 Shew how to solve a triangle having given two sides and the included angle

10 Shew that two places in latitude 45 and whose difference of longitude is 90° are $\frac{1}{2}$ of the distance of places on the equator with the same difference of longitude

Subject ——— Botany ———

Questions

1 Name all the parts of a dichlamydeous flower and note the position and the particular function peculiar to each part

2 Explain how plants are fed and name some of the substances which are capable of being imbibed as food

3 Under what conditions of structure can the following terms be applied in Botany dyngeneseous polyadelphous hypogynous gynandrous polygynous gamopetalous epigynous

4 Which are the nutritive organs of plants and why are they so called

5 Name eight natural orders including important forest trees under cultivation in India and two examples

Upper Dept x Algebra 19 School of Engineering

6 What terms are employed by Botanists to denote the prevalent forms of fruit

7 Describe comprehensively by what structural features the natural orders Solanaceæ Scrophulariaceæ and Acanthaceæ can be distinguished from each other

8 Give a botanical description of the Sandal wood tree

9. Why are plants called organic bodies

10 Draw pen and ink sketches of the following leaf forms

Digitate ___ Pinnate ___ Peltate

Cordate ___ Sagittate ___ Palmate

Ovate ___ Hastate ___ Rotundate

Subulate ___ Obovate ___ Elliptical

By what structural arrangement can we determine if a plant is exogenous or endogenous

12. How are all flowering plants classified ___

Upper Dept. Algebra 19 School of Engineering

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Upper Dept Arts — Algebra — 19 School of Engineering & Natural Science

August 1877

I If the same values of x & y satisfy the three Equations

$$ax + by = c$$
$$a'x + b'y = c'$$
$$a''x + b''y = c''$$

prove that $c(a'b'' - a''b') + c'(a''b - ab'') + c''(ab' - a'b) = 0$

II Prove that the sum of the products of the first n natural numbers taken two and two together is

$$\frac{(n-1)\,n(n+1)(3n+2)}{24}$$

III Prove the Binomial Theorem for any Exponent

Shew that $\left(\frac{+2x}{1+x}\right)^n = 1 + n\frac{x}{1+2x} + \frac{n(n+1)}{1\,2}\frac{x^2}{(1+2x)^2} + \cdots$

IV Find the value of $\left(\frac{1-x}{1+x}\right)^{\frac{1}{x}}$ when $x = 0$

V If $\frac{b}{g}$, $\frac{b'}{g'}$ & $\frac{b''}{g''}$ be any three consecutive convergents to a Continued Fraction

Prove that $\frac{b'}{g'} = \frac{b'' - b}{g'' - g}$

VI Shew how you will solve in positive integers Equations of the form $ax + by = c$

Solve the following Eqns in positive integers

(i) $x + 7y = 23$

(ii) $5x^2 + 13xy + 6y^2 - 74x - y + 117 = 0$

VII Split $\frac{\qquad}{(x-a)(x-b)(x-c)}$ into partial fractions and find the general term and also find the general term by the Binomial Theorem and verify your result

VIII Sum up the following series and find for what values of x they will be respectively Convergent and Divergent

(I) $1 + 2x + 3x^2 + 4x^3 + 5x^4 + \cdots\cdots$

(II) $1 - 3x + 7x^2 - 15x^3 + 31x^4 - \cdots\cdots$

School of Engineering & Natural Science

Quarterly Examination 21

August 1877

Upper Department (Class)

Trigonometry

1 The sides of a triangle are 24, 30, & 18, find the area

2 Two angles of a triangle are 15° and 45° and the included side 10 feet. Find the area

3 Find the radius of the circle inscribed in a triangle whose sides are 338, 360 & 210.

4 The sides of a triangle are x^2+x+1, $2x+1$ and x^2-1, shew that the greatest angle is 120°

5 Prove that $\tan \frac{A}{2} = \sqrt{\left\{\frac{(s-b)(s-c)}{s(s-a)}\right\}}$

6 If two circles whose radii are a & b touch each other externally and if θ be the angle contained by the two common tangents to these circles, shew that

$$\sin \theta = \frac{4(a-b)\sqrt{ab}}{(a+b)^2}$$

7 Expand a^x in a series of ascending powers of x

8 What is approximately the height of an object which at the distance of a mile subtends at the

9 Find the sum and cosine of an angle of 86°

10 Find $\sin 3A$ in terms of trigonometrical functions of A

11. Show that $\tan \frac{2A}{2} = \frac{2\sin A - \sin 2A}{2\sin A + \sin 2A}$

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School of Engineering & Natural Science

Bangalore

Surveying and Manouvration

Explain what are tie-lines & what guides you in choosing them.

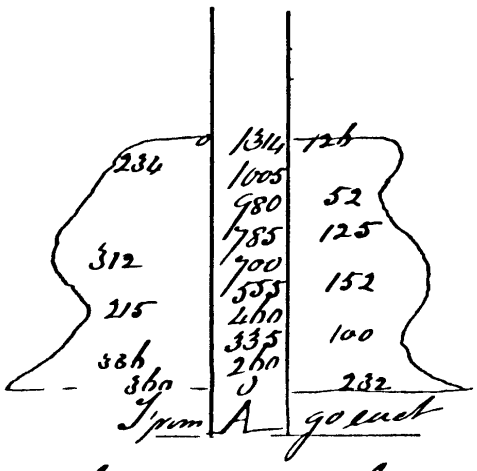
How will you fix objects on either side of your chain line if they be too far for offsets

3 Explain how you will put yourself between two objects and in line with them and also how you will fix the intersection of two lines in the field

4 Give all the methods you know for finding the breadth of a stream

5 In a triangle deduce a formula for the tie line in terms of the known sides

6 Plot the following and Calculate the area



7 Find the area of a segment of a circle whose chord is 32 ft and height is 8 ft

8 Find the cost of paving a Court yard in the form of a Rhombus the base of which is equal to 265 3/4 ft and

perpendicular which passes at the distance of 100 ft fr.
the end of the base is equal to 246/4 ft the Cost-
ner dyppard heing 3 hs

9 Shew how you Convert an irregular figure of 5 sides
into a triangle having its base in line with one of
the sides

10 Construct a circular (radius 2 inches) Vernier scale
to read 30 seconds.

School of Engineering and Natural Sciences

Quarterly Examination

August 1877.

Upper Department (New)

Coordinate Geometry

C. Waters M.A

Define "Tangent to a curve "Equation to a Curve and Locus of an equation

Define the locus represented by —

$x^4 - y^4 = 0$

$25x^2 - 9y^2 - 10x + 6y = 0$

$(x-a)(x^2 - a^2 - ax\tan\theta \sin\theta) = 0$

2. Shew that $(a-b)(b-c)(c-a)$ is the area of the triangle formed by the lines

$y - 2ax + 2bc = y - 2bx + 2ac = y - 2cx + 2ab = 0$

3. Find the Equations to two Straight lines which pass through a given point and making a given angle with a given st line.

4 Find the Equation to a st line passing thro' 2 pts

5 Find the Polar Equation to a st line passing through two given points.
Give a Geometrical interpretation of the same

6 Investigate the Equation of the perpendicular on a given st line from a given point (Rect. axes)

Show that the length of the perpendicular the axes being inclined at an angle ω from a given point h & k perpendicular to one of the axes inclined at an angle ω then feet are found from that the length of the perpendicular on the line is

$$\frac{hk \sin^2 \omega}{\sqrt{\{h^2+k^2+2hk\cos\omega\}}}$$

7. Find the Equation to a circle (Rectangular coordinates) and shew that if x_1, y_1 and x_2, y_2 be the extremities of a diameter the Eqn to the circle is

$$(x-x_1)(x-x_2)+(y-y_1)(y-y_2)=0$$

8 Find the Equation of the tangent at any point in a circle and shew that it touches according to Euclids definition-

9 Find the polar Equation to a circle and shew how to convert Polar and Rectangular Coordinates of a point-

Quarterly Examination

Algebra

Question X877

Lower Department

Ex. Mr. S. Krishnaswamy Iyer B.A.

I. Simplify

(a) $$\frac{(a+bc)(b+ca)(c+ab)-(1+a^2)(1+b^2)(1+c^2)-(ab+c)(a^2+b^2+c^2+1)}{(1+ab)(a^2+b^2+c^2+1)}$$

(b) $$\frac{\sqrt{16+30\sqrt{-1}}+\sqrt{16-30\sqrt{-1}}}{(\sqrt{5}-\sqrt{2})\sqrt{4+2\sqrt{3}}}$$

II. State and prove the rule for finding the L C M of two algebraical expressions

If $(a+b)$ is the G C M of x^2+mx+n and $x^2+m'x+n'$ find their L C M.

III. Solve

(I) $$mx^2-2mx\sqrt{n}=lx^2-mn$$

(II) $$(x-y)(x^2-y^2)^3=a$$
$$(x+y)(x^2+y^2)=b$$

IV. Investigate the signs of the expression ax^2+bx+c for real values of x when they are possible and different.

(I) Find when will the following Expressions are be positive $x^2+\frac{4}{5}x+\frac{2}{7}$

(II) $$x\left(\frac{5}{7}-3x\right)-\frac{9}{26}$$

(III) $$16y^2+28y-8$$

V If A varies as B when C is Constant and A varies as C when B is Constant, then A varies as BC when B & C vary

If a, b, c vary so that (a+b−c) is constant and (b+c−a)(c+a−b) varies as ab, then will a+b+c vary as ab

VI Prove that $S = \frac{a(1-r^n)}{1-r}$ in the case of a Geometrical series, obtain the corresponding expression for an infinite series and interpret the sign of Equality in the formula so obtained.

VII Sum the following Series—

(I) $1\,2\,3 + 2\,3\,4 + 3\,4\,5 + \ldots$ to n terms

(II) $n + 2n + 3n^2 + 4n^3 + \ldots$ to infinity

(III) $1\frac{1}{2} + 3\frac{1}{4} + 5\frac{1}{8} + 7\frac{1}{16} + \ldots$ to n terms

VIII Find the Number of Permutations of n things taken r at a time

Prove a priori that the Number of Combinations of n things taken r at a time is the same as the Number taken $n-r$ at a time

IX How many words can you form out of 15 Consonants and 9 vowels, first each word may consist of 2 consonants and one vowel, secondly that each word may consist of 3 consonants & 2

X Prove the Binomeal thm

XI

School of Engineering and Natural Science, Bangalore

QUARTERLY EXAMINATION,

August 18 7.

LOWER DEPARTMENT

TRIGONOMETRY

Examiner — A. G. KING, B. A.

1 Prove *geometrically*

(*a*) $\tan^2 \frac{A}{2} = \frac{1-\cos A}{1+\cos A}$

(*b*) $\cos 24 = \cos 60° \cos 36 + \sin 60° \sin 36$

2. Investigate the expression for one side of a triangle in terms of the *other* sides and the *angle included* by them; put it into a form suitable for logarithmic computation.

Equilateral triangles ABC, DBC are described on the side BC of a triangle ABC; prove that $AD^2 + AD^2 = a^2 + b^2 + c^2$. Express cos DAD in terms of the sides a b c. If equilateral triangles be in like manner described on the other two sides and the angles DAD, FBE, FCF be described by α β γ shew that $\cos \alpha + \cos \beta + \cos \gamma + 1 = \cos 2\alpha + \cos 2\beta + \cos 2\gamma$

3 At each of *three* stations in the same horizontal plain and at given distances from each other the elevation of a tower is observed to be α. Find its height.

4 In any triangle the sides are proportional to the sines of the opposite angles.
Hence shew that $a = b \cos c + c \cos B$

5 Solve the equations

(i) $\sin 2\theta + \cos^2\theta = \frac{1}{4}$

(ii) $p \sin^2\theta - q \sin^2\phi = p$

$p \cos^2\theta - q \cos^2\phi = q$

6 Define dip of horizon.

A person standing in a balloon observes the dip of the horizon as α at successive heights h, k, shew that

$$\frac{h}{k} = \frac{(1-\cos\alpha)\cos\alpha}{(1-\cos\alpha)\cos\alpha}$$

7 Define angle of elevation, angle of depression.

How would you find the distance between the summits P, Q of two mountains?

AB, CD are two towers in the same horizontal plain; the height of AB is a; the elevation of D at A the top of the tower AB is α, at B is β; find the height of CD and the distances between the tops and bases of the towers.

From the top of a hill the depression of a point on the plain below is 30° and from a spot three quarters of the way down the depression of the same point is 45°; find the inclination of the hill.

School of Engineering and Natural Science, Bangalore.

QUARTERLY EXAMINATION

August 18 7

LOWER DEPARTMENT

EUCLID

Examiner —S KRISTNASAMIYER B A

1 Parallelograms on the same base and between the same parallels are equal to one another

2. At a given point in a given straight line to make a rectilineal angle equal to a given rectilineal angle

   Given the perpendicular drawn from the vertex to the base and the difference between each side and the adjacent segment of the base made by the perpendicular to construct the triangle

3. If the straight line AB be bisected at C and produced to D prove that the rectangle AD DB, together with the square on CB is equal to the square on CD

   Prove by aid of proposition 5 and 7 of the 2nd BK and without any construction that the squares on AD DB are together double of the squares on AC, CD

4. Through a given point within a circle draw (1) the longest chord (2) the shortest chord (3) a chord of given length

5 ACDB is a semicircle of which AB is the diameter the semicircular arc is trisected at C and D if C be joined with the centre O and D with A so as to intersect at F prove that the triangle AFB is equal to the triangle DOB

6 If two opposite angles of a quadrilateral figure be together equal to two right angles the quadrilateral is in circumscribed in a circle

7 Two tangents to a circle of given radius are given in position describe the circle

8 What geometrical relations are proved in the 6th Bk by bisecting the vertical angle of a triangle by straight line which also meets the base

   Prove that the straight lines which bisect the angles of a triangle meet at the same point

9 Parallelograms which are equiangular to one another have to one another the ratio which is compounded of the ratios of their sides

   Hence prove that similar triangles are to one another in the duplicate ratio of their homologous sides

10 The rectangle contained by the diagonals of a quadrilateral figure inscribed in a circle is equal to both the rectangles contained by the opposite sides

   If the diagonals of a quadrilateral figure cut each other at right angles the rectangles contained by the opposite sides are together double of the quadrilateral figure.

School of Engineering and Natural Science, Bangalore.

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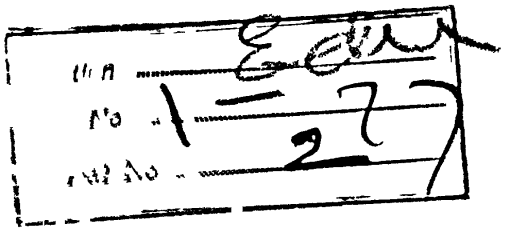
Education

31 Read

Letter No R.C. 2253.77
12th September 1877, from the
Director of Public Instruction

Order thereon —



The Director of Public Instruction submits Report on the quarterly examination of the students of the School of Engineering & Natural Science, held in August

2. The students of the Junior or third year class of the Upper Division were examined in the following subjects —

Engineering Class

Chemistry
Surveying & Levelling
(Theoretical & Practical)
Engineering
Mensural Trigonometry

Forest Class

Chemistry
Surveying & Levelling
(Theoretical & Practical)
Botany
Spherical Trigonometry

All the students of the
~~Engineering~~ Engineering class passed
except Srinivasa Rao
who was prevented by illness
from attending
~~absent at~~ the examination
in Spherical Trigonometry, but,
in the other subjects, he
~~ought to obtained~~ obtained 311 marks and
~~obtained that, were he~~
ranks 4th in the list
~~of the non-attendance~~
as shown in the margin
~~at the Examinations~~
the subject above named,
Srinivasa Rao has not
answered as creditably
as he ought to have done
He should be warned
to show better results

9 is the marginal to be seen

Nos of marks obtained by the students in all the subjects excepting Spherical Trigonometry

1 Rajamanikam Naidu	324
2 Venkatachari	315
3 Govindachari	312
4 Srinivasa Rao	311
5 Balakrishnaswami	302

3 In the Forest class,
all the students have
~~and in examination~~
passed, Abdul Karim having
~~have~~ passed very creditably
~~about forest as Chemistry~~,
obtained full marks

3 Drawing ~~in the subjects, & the~~
~~Class~~ Lower Division ~~were~~
pleased to ~~reduce~~ the
rate of School fee
payable by them from 15/ to
10/ with effect from 1st instant
~~under the terms of~~
~~paragraph 11 of the Notification~~
~~No 1939 dated 29th September 1876~~

4 The Junior or first
year students of the
Upper Division, have all
passed the examination,
~~which was held in the~~
following subjects :-

Algebra
Plane Trigonometry
Surveying (Theoretical)
~~& Levelling~~
Drawing
Coordinate Geometry

5 The 1st Class of the
Lower Division was
examined in the subjects

noted below —

Algebra
Plane Trigonometry
Surveying (Theoretical)
Drawing
Euclid

~~Though~~ All the students obtained more than one-third of the maximum number of marks, but applying the Chief Commissioners Ruling, contained in para 5 of this office Rio No. 2435 Ed. 3 of 8th June 1877, the following students who failed in one or more individual subjects are declared as not having passed

Arumugam Mudaliar
Rathnavatha Ayyangar
Ananda Rao
Srinivasa Rao

These four students ~~are~~ have

9877

3

allowed to remain in the institution with a warning that if they again fail to pass in any of the subjects in which they are examined at the close of the next quarter, they will be dismissed

By order
Secretary

To
The Director of Public Instruction
Chief Engineer, P.W.D.
Conservator of Forests

9877

Government of Guyana

Educational

To The Director of Public Institutions
" Chief Engineer, P.W.D.
Conservator of Forests
Treasurer

Dated 2nd October
Desp'd
Rec'd

27/9

No 6311
931

One Page.

4 Dec
2-10-31

Report on the quarterly examination of students of the School of Engineering & Natural Science held in August last - Passing orders thereon -

16 Copies desp
1 to absentee
1 attached to draft
13 Reserve
31

Proceedings of the Chief Commr of Mysore, Educational Department,
2 tober 1877

Letter No 2253 dated 12th September from the Director of Public Instruction.

No 6311—GENL 931, DA BANGALORE, 2ND OCTOBER 1877

ORDER THEREON —The Director of Public Instruction submits report on the quarterly examination of the students of the Sl of Engineering and Natural Science, held in August last

2 The students of the senior or th year class of the upper division were examined in the following subjects —

Engineering Class	*Forest Class*
Chemistry	Chemistry
Surveying and Levelli (Theoretical and Pract al)	Surveying and Levelling, (Theoretical and Practical)
Engineering	Botany
Spherical Trigonometr	Spherical Trigonometry

All the students of the Engineering passed, except Srinivas Rao, who was prevented by illness from attending the examination in Spheric Trigonometry but, in the other subjects, he obtained 11 marks and ranks 4th in the list as shewn in the gn

		No of marks obtained by the successful candidate except in Surveying which is practical
1	Raghavalu Naidu	324
2	Venkatachari	315
3	Govindachari	312
4	Srinivas Rao	311
5	Balakrishna Tivari	302

3 In the Forest class, all the stud have passed Abdul Karim has passed very creditably, having obtained full marks in es ry

4 The juniors or first year stud of the upper division have all passed the examination in the following subjects —

Algebra
Plane Trig etry
Surveying oretical) and Levelling
Drawing
Co-ordinate ometry

5 The 1st class of the lower division s examined in the subjects noted below —

Algebra
Plane Trigo metry
Surveying (Theoretical)
Drawing
Euclid

All the students obtained more than e third of the maximum number of marks, but applying the Chief Commissioner's rule, contained in para 5 of this office Proceedings No 2130—Edl 3, dated 8th June 18 , the following students, who failed in one or more individual subjects, are declared as not having passed —

Armugam Mudaliar
Raghunathacharyar
Ananda Rao
Srinivas Rao

These four students however are allowed to remain in the institution, with a warning that, if they again fail to pass in any of the subjects in which they are examined at the close of the next quarter, they will be dismissed

T CLARKE,
Secretary

To—The Director of Public Instruction.
" Chief Engineer P W D
" Conservator of Forests.

5 offices copies.
4 5 5
4 5

16 offices dept
1 to apnts
1 attached Draft
13 Reserve — —
31

5-1.

1877.

GOVERNMENT OF MYSORE.

EDUCATIONAL

To

THE DIRECTOR OF PUBLIC INSTRUCTION
" CHIEF ENGINEER P W D
" CONSERVATOR OF FORESTS

Dated October 2nd
Despatched
Received

No 6311
Edl 931

Report on the Quarterly Examination of students of the School of Engineering and Natural Science held in August last—Passing orders thereon